CLAIMS

1. An energy reclamation system for harvesting energy from ambient radio frequency (RF) signals, comprising:

a first subsystem having at least one antenna for receiving ambient RF signals;

a second subsystem having circuitries for converting RF energy from the received ambient RF signals to DC electrical power; and

a third subsystem having a power storage device for storing the converted DC electrical power as charged by the second subsystem.

2. The energy reclamation system of claim 1, wherein the at least one antenna comprises an array of antennas.

3. The energy reclamation system of claim 1, wherein the at least one antenna comprises a wideband, omni directional antenna optimized to receive the ambient RF signals in a selected frequency range.

4. The energy reclamation system of claim 2, wherein each antenna in the array of antennas comprises a wideband, omni directional antenna optimized to receive the ambient RF signals in a selected frequency range.

5. The energy reclamation system of claim 2, wherein each antenna in the array of antennas is optimized to receive the ambient RF signals in a selected frequency that is different from that of another antenna in the array of antennas.

6. The energy reclamation system of claim 1, wherein the circuitries of the second subsystem is formed on an application specific integrated circuit (ASIC) chip that is integrated with the at least one antenna for converting the RF energy to DC electrical power.

7. The energy reclamation system of claim 1, wherein the circuitries of the second subsystem comprises:

a rectifier for converting the RF energy into DC electrical power; and

a trickle charger for charging the DC electrical power to the battery or power storage device of the third subsystem.

8. The energy reclamation system of claim 1, wherein the power storage device comprises a plurality of battery micro-cells.

9. The energy reclamation system of claim 1, wherein the battery of the third subsystem comprises an NxM array of battery micro-cells, wherein N and M are natural numbers.

10. The energy reclamation system of claim 9 wherein the battery micro-cells are charged with the converted DC electrical power on a cell by cell basis.

11. An energy reclamation system for harvesting ambient energy, comprising:

a first subsystem for harvesting two or more different types of ambient energy;

a second subsystem for converting the harvested ambient energy into DC electrical power; and

a third subsystem for storing the DC electrical power.

12. The energy reclamation system of claim 11, wherein the first subsystem comprises:

a first transducer having at least one antenna for receiving ambient RF energy and converting the RF energy to electrical energy; and

a second transducer for receiving ambient energy of a type different from the RF energy.

13. The energy reclamation system of claim 12, wherein the second transducer comprises:

a solar energy conversion device for receiving ambient solar energy and converting the solar energy to electrical energy.

14. The energy reclamation system of claim 13, wherein the solar energy conversion device comprises an array of solar cells.

15. The energy reclamation system of claim 12, wherein the second transducer comprises:

an acoustical energy conversion device for receiving ambient acoustical energy and converting the acoustical energy to electrical energy.

16. The energy reclamation system of claim 15, wherein the acoustical energy conversion device comprises a piezoelectric transducer.

17. The energy reclamation system of claim 12, wherein the second transducer comprises:

a mechanical energy conversion device for receiving ambient mechanical energy and converting the mechanical energy to electrical energy.

18. The energy reclamation system of claim 17, wherein the mechanical energy conversion device comprises a transducer for transducing mechanical energy derived from a natural acceleration of an object or person while in transport or in use.

19. The energy reclamation system of claim 12, wherein the at least one antenna is also for receiving RF energy from an intended RF power source.

20. A wireless communication apparatus comprising:

a first antenna for receiving communication signals;

a second antenna for receiving ambient radio frequency (RF) signals;

communication processing circuitry for processing the communication signals; a first power source for powering the communication processing circuitry;

an energy conversion subsystem for converting the ambient RF signals into DC electrical power; and

an energy storage subsystem for storing energy charged by the DC electrical power, wherein the energy storage subsystem provides power to the first power source.

21. The wireless communication apparatus of claim 20, further comprising:

a switching circuitry for receiving an activation signal; and

a monitor and activation circuitry for receiving the activation signal from the switching circuitry.

22. The wireless communication apparatus of claim 21, wherein the switching circuitry receives the activation signal from the first antenna.

23. The wireless communication apparatus of claim 21, wherein the monitor and activation circuitry enables the switching circuitry to electrically connect the first antenna to the communication processing circuitry.

24. The wireless communication apparatus of claim 21, wherein the energy storage subsystem provides power to the monitor and activation circuitry.

25. The wireless communication apparatus of claim 21, wherein the energy storage subsystem provides power to the switching circuitry.

26. The wireless communication apparatus of claim 20, wherein the DC electrical power is further provided to the first power source.

27. The wireless communication apparatus of claim 20, wherein the first antenna is also for receiving the ambient RF signals, and the second antenna is also for receiving the communication signals.

28. A method for harvesting and utilizing electromagnetic energy, comprising:

receiving ambient electromagnetic energy;

converting the ambient electromagnetic energy into DC electrical power; and

charging a power storage component with the DC electrical power.

29. The method of claim 28, further comprising:

providing the DC electrical power to a device power source for powering an electrical device once the power storage component is completely charged.

30. The method of claim 28, wherein the power storage component comprises a NxM array of battery micro-cells, wherein N and M are natural numbers.

31. The method of claim 30, further comprising:

providing a device power source for powering an electrical device; and

drawing power from the power storage component to power the electrical device.

32. The method of claim 31, wherein drawing power from the power storage component to power the electrical device comprises:

determining a charged PxQ sub-array of the NxM array of battery micro-cells, wherein P and Q are natural numbers less than N and M, respectively; and

drawing power from the charged PxQ sub-array to power the electrical device.

33. The method of claim 32, wherein charging the power storage component with the DC electrical power comprises:

charging at least one remaining micro-cell of battery in the NxM array that is not in the charged PxQ sub-array;

substituting the PxQ sub-array with the at least one remaining micro-cell of battery once the PxQ sub-array is depleted of power; and

charging the depleted PxQ sub-array with the DC electrical power.

34. The method of claim 33, wherein drawing power from the power storage component to power the electrical device further comprises:

drawing power from the at least one remaining charged micro-cell of battery to power the electrical device.

35. The method of claim 31, wherein the ambient electromagnetic energy is received by at least one antenna.

36. The method of claim 35, wherein the at least one antenna and the power storage component are physically apart from the electrical device.

37. The method of claim 28, further comprising:

providing a device power source for powering an electrical device;

drawing power from the power storage component to power the electrical device; and

wherein the power storage component is located at a physical structure different from that of the electrical device.